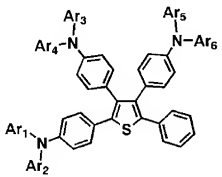
[Document Name]Description

[Title of the Invention]An organic electroluminescence element

[Claim(s)]

[Claim 1]An organic electroluminescence element which pinches further at least a layer containing at least one sort of compounds expressed with a general formula (1) to inter-electrode [a pair of].
[Chemical formula 1]



(1)

(Ar_1 - Ar_6 express independently an aryl group which is not replaced [substitution or] among a formula, respectively, and further, even if Ar_1, Ar_2 and Ar_3, Ar_4 and Ar_5, and Ar_6 form nitrogen-containing heterocycle with a united nitrogen atom, they express ****)

[Claim 2]The organic electroluminescence element according to claim 1 whose layer containing a compound denoted by a general formula (1) is an electron hole pouring transportation layer.

[Claim 3]The organic electroluminescence element according to claim 1 whose layer containing a compound denoted by a general formula (1) is a luminous layer.

[Claim 4]The organic electroluminescence element according to any one of claims 1 to 2 which has a luminous layer further in inter-electrode [a pair of].

[Claim 5]The organic electroluminescence element according to any one of claims 1 to 4 which has an electronic pouring transportation layer further in inter-electrode [a pair of].

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to an organic electroluminescence element.

[0002]

[Description of the Prior Art]Conventionally, although used as panel type light sources, such as backlight, for example, in order to make this light emitting element drive, the high voltage of exchange is required for an inorganic electroluminescence element. These days came and the organic electroluminescence element (organic-electroluminescence element: organic EL device) which used organic materials for the luminescent material was developed. Appl. Phys. Lett., and [51, 913] (1987) .An organic electroluminescence element has the structure pinched

between an anode and the negative pole in the thin film containing a fluorescence organic compound, and pours an electron and an electron hole (hole) into this thin film, It is an element which emits light using the light emitted when an exciton (exciton) is made to generate and this exciton is deactivated by making it re-join together. an organic electroluminescence element -- severalV - several 10 -- it is a low voltage of about V direct current, and luminescence of various colors (for example, red, blue, green) is possible by being able to emit light and choosing the kind of fluorescence organic compound. The application to various light emitting elements, a display element, etc. is expected from the organic electroluminescence element which has such a feature. However, generally an organic electroluminescence element has difficulties, like it is scarce in stability and endurance. Improvement in the further luminous efficiency is called for from a viewpoint of low consumption energy.

[0003]As an electron hole pouring transportation material, it is a 4 and 4'-screw. [N-phenyl N-(3"-methylphenyl) amino] Using biphenyl is proposed. [Jpn. J. Appl. Phys., 27, L269 (1988)] .However, the organic electroluminescence element which uses this compound as an electron hole pouring transportation material has difficulties, like it is scarce in stability and endurance. It is 2, 3, and 5-tris as an electron hole pouring transportation material, for example. [4'-(N and N-diphenylamino) phenyl] -4-phenylthio FEN, 2 and 3, 5-tris [4'-[N and N-JI (3"-methylphenylamino] phenyl]) -4-phenylthio FEN, 3 - [4'-(N and N-diphenylamino) phenyl] -2, 5-screw [4"-[N'-phenyl N'-(3"'-methylphenyl) amino] phenyl] -Using 4-phenylthio FEN is proposed (JP,H10-125468,A). For example, although stability and endurance of the organic electroluminescence element [using the amine compound of these CHIOFEN derivative as an electron hole pouring transportation material] are improving, improvement of the further luminous efficiency is called for. Now, an organic electroluminescence element improved further is desired.

[0004]

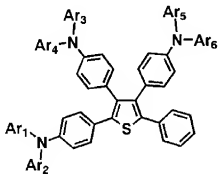
[Problem to be solved by the invention]The technical problem of this invention is providing the organic electroluminescence element by which luminous efficiency was improved.

[0005]

[Means for solving problem]This invention persons came to complete this invention, as a result of examining an organic electroluminescence element wholeheartedly. namely, this invention -- (1) -- the organic electroluminescence element which pinches further at least the layer containing at least one sort of compounds expressed with the following general formula (1) to inter-electrode [a pair of]. (2) The organic electroluminescence element given in (1) the given layer containing the compound denoted by a general formula (1) is an electron hole pouring transportation layer, (3) The organic electroluminescence element given in (1) the given layer containing the compound denoted by a general formula (1) is a luminous layer, (4) aforementioned (1)-(2) which has a luminous layer further in inter-electrode [a pair of] -- an organic electroluminescence element given in either, and (5) -- it is further related inter-electrode [a pair of] with either aforementioned (1) which has an electronic pouring transportation layer - (4), without the organic electroluminescence element of a description.

[0006]

[Chemical formula 2]



(1)

(Ar_1 - Ar_6 express independently the aryl group which is not replaced [substitution or] among a formula, respectively, and further, even if Ar_1, Ar_2 and Ar_3, Ar_4 and Ar_5, and Ar_6 form nitrogen-containing heterocycle with the united nitrogen atom, they express ****)

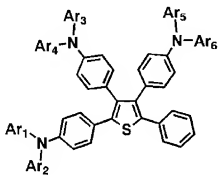
[0007]

[Mode for carrying out the invention]Hereafter, this invention is explained in detail. The organic

electroluminescence element of this invention pinches further at least the layer containing at least one sort of compounds expressed with a general formula (1) to inter-electrode [a pair of].

[0008]

[Chemical formula 3]



(1)

(Ar_1 - Ar_6 express independently the aryl group which is not replaced [substitution or] among a formula, respectively, and further, even if Ar_1, Ar_2 and Ar_3, Ar_4 and Ar_5, and Ar_6 form nitrogen-containing heterocycle with the united nitrogen atom, they express ****)

[0009]In a general formula (1), Ar_1 - Ar_6 express independently the aryl group which is not replaced [substitution or], respectively. An aryl group expresses heterocyclic aromatic series machines, such as carbocyclic aromatic series machines, for example, a frill machine, such as a phenyl group, a naphthyl group, an anthryl group, a phenan trill machine, and a fluorenyl group, a thienyl group, and a pyridyl group, for example.

[0010]Ar_1 - Ar_6 -- desirable -- un-replacing -- or, As a substituent, for example A halogen atom, an alkyl group, an alkoxy group, Or by an aryl group, are a carbocyclic aromatic series machine of single substitution or the total carbon numbers 6-26 which may be many replaced, or a heterocyclic aromatic series machine of the total carbon numbers 3-26, and more preferably, As un-replacing or a substituent, for example A halogen atom, the alkyl group of the carbon numbers 1-14, They are a carbocyclic aromatic series machine of single substitution or

the total carbon numbers 6-20 which may be many replaced, or a heterocyclic aromatic series machine of the total carbon numbers 3-20 in the alkoxy group of the carbon numbers 1-14, or the aryl group of the carbon numbers 6-10, They are single substitution or the carbocyclic aromatic series machine of the total carbon numbers 6-16 which may be many replaced as un-replacing or a substituent preferably in a halogen atom, the alkyl group of the carbon numbers 1-4, the alkoxy group of the carbon numbers 1-4, or the aryl group of the carbon numbers 6-10, for example.

[0011]In Ar_1 - Ar_6, [as an example of the aryl group which is not replaced / substitution or] For example, a phenyl group, 4-methylphenyl machine, 3-methylphenyl machine, 2-methylphenyl machine, 4-ethyl phenyl group, 3-ethyl phenyl group, 2-ethyl phenyl group, a 4-n-propyl phenyl group, 4-isopropyl phenyl group, 2-isopropyl phenyl group, a 4-n-buthylphenyl machine, 4-isobutyl phenyl group, A 4-sec - buthylphenyl machine, a 2-sec - buthylphenyl machine, A 4-tert-buthylphenyl machine, a 3-tert-buthylphenyl machine, A 2-tert-buthylphenyl machine, a 4-n-pentyl phenyl group, a 4-iso pentyl phenyl group, A 2-neopentyl phenyl group, a 4-tert-pentyl phenyl group, A 4-n-hexyl phenyl group, 4-(2'-ethyl butyl) phenyl group, A 4-n-HEPUCHIRU phenyl group, a 4-n-octyl phenyl group, 4-(2'-ethylhexyl) phenyl group, A 4-tert-octyl phenyl group, a 4-n-DESHIRU phenyl group, a 4-n-DODESHIRU phenyl group, a 4-n-tetradecyl phenyl group, 4-cyclopentyl phenyl group, 4-cyclohexyl phenyl group, 4-(4'-methylcyclohexyl) phenyl group, 4-(4'-tert-butyl cyclohexyl) phenyl group, 3-cyclohexyl phenyl group, 2-cyclohexyl phenyl group,

[0012]2, 4-dimethylphenyl machine, 2, 5-dimethylphenyl machine, 3, 4-dimethylphenyl machine, 3, 5-dimethylphenyl machine, 2, 6-dimethylphenyl machine, 2, 4-JIECHIRU phenyl group, 2, 3, 5-trimethyl phenyl machine, 2 and 3, 6-trimethyl phenyl machine, 3, 4, 5-trimethyl phenyl machine, 2, 6-JIECHIRU phenyl group, 2, 5-diisopropylphenyl machine, 2, a 6-diisobutyl phenyl group, 2, a 4-G tert-buthylphenyl machine, 2, a 5-G tert-buthylphenyl machine, 4, a 6-G tert-butyl 2-methylphenyl machine, a 5-tert-butyl 2-methylphenyl machine, the 4-tert-butyl 2, 6-dimethylphenyl machine,

[0013]4-methoxypheny machine, 3-methoxypheny machine, 2-methoxypheny machine, A 4-ethoxy phenyl group, a 3-ethoxy phenyl group, a 2-ethoxy phenyl group, A 4-n-propoxy phenyl group, a 3-n-propoxy phenyl group, 4-isopropoxy phenyl group, 2-isopropoxy phenyl group, a 4-n-butoxy phenyl group, a 4-iso butoxy phenyl group, A 2-sec - butoxy phenyl group, a 4-n-

pentyloxy phenyl group, 4-isopentyloxy phenyl group, 2-isopentyloxy phenyl group, A 4-neo pentyloxy phenyl group, a 2-neo pentyloxy phenyl group, A 4-n-hexyloxy phenyl group, 2-(2'-ethyl butyl) OKISHI phenyl group, A 4-n-octyloxy phenyl group, a 4-n-decyloxy phenyl group, a 4-n-dodecyloxy phenyl group, a 4-n-tetra-decyloxy phenyl group, 4-cyclohexyloxy phenyl group, 2-cyclohexyloxy phenyl group,

[0014]A 2-methyl 4-methoxypheny machine, a 2-methyl 5-methoxypheny machine, A 3-methyl 4-methoxypheny machine, a 3-methyl 5-methoxypheny machine, A 3-ethyl 5-methoxypheny machine, a 2-methoxy 4-methylphenyl machine, A 3-methoxy 4-methylphenyl machine, 2, 4-dimethoxy phenyl group, 2, 5-dimethoxy phenyl group, 2, 6-dimethoxy phenyl group, 3, 4-dimethoxy phenyl group, 3, 5-dimethoxy phenyl group, 3, 5-diethoxy phenyl group, 3, a 5-G n-butoxy phenyl group, a 2-methoxy 4-ethoxy phenyl group, a 2-methoxy 6-ethoxy phenyl group, 3 and 4, 5-trimethoxyphenyl machine,

[0015]4-fluoro phenyl group, 3-fluoro phenyl group, 2-fluoro phenyl group, 4-chlorophenyl machine, a 3-chlorophenyl machine, 2-chlorophenyl machine, 4-bromo phenyl group, 2-bromo phenyl group, 2, a 3-difluoro phenyl group, 2, a 4-difluoro phenyl group, 2, a 5-difluoro phenyl group, 2, a 6-difluoro phenyl group, 3, a 4-difluoro phenyl group, 3, a 5-difluoro phenyl group, 2, 3-dichlorophenyl machine, 2, 4-dichlorophenyl machine, 2, 5-dichlorophenyl machine, 3, 4-dichlorophenyl machine, 3, 5-dichlorophenyl machine, 2, 5-dibromo phenyl group, 2 and 4, 6-bird chlorophenyl machine, A 2-fluoro 4-methylphenyl machine, a 2-fluoro 5-methylphenyl machine, A 3-fluoro 2-methylphenyl machine, a 3-fluoro 4-methylphenyl machine, A 2-methyl 4-fluoro phenyl group, a 2-methyl 5-fluoro phenyl group, A 3-methyl 4-fluoro phenyl group, a 2-chloro 4-methylphenyl machine, a 2-chloro 5-methylphenyl machine, a 2-chloro 6-methylphenyl machine, 2-methyl 3-chlorophenyl machine, a 2-methyl 4-chlorophenyl machine, A 3-chloro 4-methylphenyl machine, a 3-methyl 4-chlorophenyl machine, The 2-chloro 4, 6-dimethylphenyl machine, a 2-methoxy 4-fluoro phenyl group, A 2-fluoro 4-methoxypheny machine, a 2-fluoro 4-ethoxy phenyl group, A 2-fluoro 6-methoxypheny machine, a 3-fluoro 4-ethoxy phenyl group, a 3-chloro 4-methoxypheny machine, a 2-methoxy 5-chlorophenyl machine, a 3-methoxy 6-chlorophenyl machine, the 5-chloro 2, 4-dimethoxy phenyl group,

[0016]4-phenyl phenyl group, 3-phenyl phenyl group, 2-phenyl phenyl group, 4-(4'-methylphenyl) phenyl group, 4-(3'-methylphenyl) phenyl group, 4-(4'-ethyl phenyl) phenyl group, 4-(4'-isopropyl phenyl) phenyl group, 4-(4'-tert-buthylphenyl) phenyl group, 4-(4'-n-hexyl

phenyl) phenyl group, 4-(4'-n-octyl phenyl) phenyl group, 4-(4'-n-DODESHIRU phenyl) phenyl group, 3-(4'-methylphenyl) phenyl group, 2-(4'-methylphenyl) phenyl group, 2-(4'-ethyl phenyl) phenyl group, 4-(4'-methoxypheny) phenyl group, 4-(3'-methoxypheny) phenyl group, 4-(4'-ethoxy phenyl) phenyl group, 4-(4'-n-butoxy phenyl) phenyl group, 4-(4'-n-hexyloxy phenyl) phenyl group, 4-(4'-n-octyloxy phenyl) phenyl group, 4-(4'-n-decyloxy phenyl) phenyl group, 3-(4'-methoxypheny) phenyl group, 2-(4'-methoxypheny) phenyl group, 2-(2'-methoxypheny) phenyl group, 4-(4'-fluoro phenyl) phenyl group, 4-(4'-chlorophenyl) phenyl group, 4-(3'-fluoro phenyl) phenyl group, 4-(2'-fluoro phenyl) phenyl group, 2-(4'-fluoro phenyl) phenyl group, a 3-methyl 4-phenyl phenyl group, A 4-methyl 3-phenyl phenyl group, a 4-methyl 2-phenyl phenyl group, A 5-methyl 2-phenyl phenyl group, a 6-methyl 3-phenyl phenyl group, A 2-ethyl 4-phenyl phenyl group, a 4-ethyl 2-phenyl phenyl group, A 2-methoxy 4-phenyl phenyl group, a 3-methoxy 4-phenyl phenyl group, A 4-methoxy 2-phenyl phenyl group, a 4-fluoro 2-phenyl phenyl group, A 3-fluoro 4-phenyl phenyl group, a 3-fluoro 2-phenyl phenyl group, A 5-fluoro 2-phenyl phenyl group, 2, 4-diphenyl phenyl group, a 2-phenyl 4-(4'-methylphenyl) phenyl group, 3, 4-diphenyl phenyl group, 3, 5-diphenyl phenyl group,

[0017]1-naphthyl group, 2-naphthyl group, a 2-methyl 1-naphthyl group, a 4-methyl 1-naphthyl group, A 4-ethyl 1-naphthyl group, a 4-n-butyl 1-naphthyl group, a 4-n-hexyl 1-naphthyl group, A 4-n-******- 1-naphthyl group, a 5-methyl 1-naphthyl group, a 1-methyl 2-naphthyl group, A 6-methyl 2-naphthyl group, a 6-ethyl 2-naphthyl group, a 6-n-butyl 2-naphthyl group, A 6-n-octyl 2-naphthyl group, a 2-methoxy 1-naphthyl group, A 4-methoxy 1-naphthyl group, a 4-n-butoxy 1-naphthyl group, A 5-ethoxy 1-naphthyl group, a 6-methoxy 2-naphthyl group, a 6-ethoxy 2-naphthyl group, A 6-n-butoxy 2-naphthyl group, a 6-n-hexyloxy 2-naphthyl group, A 7-methoxy 2-naphthyl group, a 7-n-butoxy 2-naphthyl group, A 4-phenyl 1-naphthyl group, a 6-phenyl 2-naphthyl group, a 4-fluoro 1-naphthyl group, A 2-fluoro 1-naphthyl group, a 4-chloro 1-naphthyl group, a 4-chloro 2-naphthyl group, a 6-chloro 2-naphthyl group, a 6-bromo 2-naphthyl group, 2, a 4-dichloro 1-naphthyl group, 1, a 6-dichloro 2-naphthyl group,

[0018]1-anthryl group, 2-anthryl group, 9-anthryl group, a 6-methyl 2-anthryl group, A 6-tert-butyl 2-anthryl group, a 10-methyl 9-anthryl group, A 10-ethyl 9-anthryl group, a 10-n-hexyl 9-anthryl group, a 5-phenyl 1-anthryl group, a 6-phenyl 2-anthryl group, a 10-phenyl 9-anthryl group, a 10-(4'-methylphenyl)-9-anthryl group,

[0019]1-phenan trill machine, 2-phenan trill machine, 3-phenan trill machine, 9-phenan trill

machine, a 3-methyl 1-phenan trill machine, a 5-methyl 1-phenan trill machine, A 6-tert-butyl 1-phenan trill machine, a 6-methyl 2-phenan trill machine, A 1-methyl 9-phenan trill machine, an 8-methyl 9-phenan trill machine, A 2-methyl 9-phenan trill machine, a 2-ethyl 9-phenan trill machine, A 3-methyl 9-phenan trill machine, a 3-n-butyl 9-phenan trill machine, A 6-methyl 9-phenan trill machine, a 10-methyl 9-phenan trill machine, 2, a 3-********- 9-phenan trill machine, 3, a 6-********- 9-phenan trill machine, A 1-methoxy 9-phenan trill machine, a 2-methoxy 9-phenan trill machine, A 3-methoxy 9-phenan trill machine, a 10-methoxy 9-phenan trill machine, a 3-methoxy 7-methyl 9-phenan trill machine, a 3-phenyl 1-phenan trill machine, a 6-phenyl 1-phenan trill machine, and 2-(4'-methylphenyl)- 9-phenan trill machine, a 3-phenyl 9-phenan trill machine, and a 1-chloro 9-phenan trill machine. A 3-fluoro 9-phenan trill machine, a 7-chloro 9-phenan trill machine,

[0020]2-fluorenyl group, a 9-methyl 2-fluorenyl group, a 9-ethyl 2-fluorenyl group, A 9-isopropyl 2-fluorenyl group, a 9-n-octyl 2-fluorenyl group, A 9 and 9-********- 2-fluorenyl group, 9, and 9-********- 2-fluorenyl group, A 9,9-G n-propyl 2-fluorenyl group, 9, and 9-di-n-butyl 2-fluorenyl group, A 9 and 9-G n-hexyl 2-fluorenyl group, the 7-methyl 9, a 9-********- 2-fluorenyl group, The 7-tert-butyl 9, a 9-********- 2-fluorenyl group, a 9-phenyl 2-fluorenyl group, A 7-phenyl 9, 9-********- 2-fluorenyl group, 7-(4'-methylphenyl)-9, and 9-********- 2-fluorenyl group, A 7-(4'-tert-buthylphenyl)-9 and 9-********- 2-fluorenyl group, 7-ethoxy 9, a 9-********- 2-fluorenyl group, the 7-chloro 9, a 9-********- 2-fluorenyl group, A 9 and 9-diphenyl 2-fluorenyl group, a 9-phenyl 9-methyl 2-fluorenyl group, a 9-(4'-methylphenyl)-9-n-hexyl 2-fluorenyl group,

[0021]4-quinolyl machine, 2-pyridyl group, 3-pyridyl group, 4-pyridyl group, A 2-ethyl 4-pyridyl group, a 4-phenyl 2-pyridyl group, a 2-phenyl 4-pyridyl group, Although 2-frill machine, 3-frill machine, 2-thienyl group, 3-thienyl group, 2-thiazolyl machine, 2-benzoxazolyl machine, 2-benzothiazolyl machine, a 2-benzoimidazolyl group, etc. can be mentioned, it is not limited to these.

[0022]In the compound denoted by a general formula (1), further Ar_1 and Ar_2, Ar_3, Ar_4 and Ar_5, and Ar_6 may form nitrogen-containing heterocycle with the united nitrogen atom, and preferably, -, [NAr_1Ar_2, $-NAr_3Ar_4$, and $-NAr_5Ar_6$] The -N-FENOKISAJINIIRU machine which is not replaced [the -N-KARUBAZORIIRU machine which is not replaced / substitution or /, substitution or], Or may form the -N-FENOCHIAJINIIRU machine which is not replaced

[substitution or] and preferably, As un-replacing or a substituent, for example A halogen atom, the alkyl group of the carbon numbers 1-10, By the alkoxy group of the carbon numbers 1-10, or the aryl group of the carbon numbers 6-10, single substitution or the -N-KARUBAZORIIRU machine which may be many replaced, -Are N-FENOKISAJINIIRU machine or a -N-FENOCHIAJINIIRU machine, and more preferably, As un-replacing or a substituent, by the halogen atom, the alkyl group of the carbon numbers 1-4, the alkoxy group of the carbon numbers 1-4, or the aryl group of the carbon numbers 6-10, for example Single substitution or the -N-KARUBAZORIIRU machine which may be many replaced, a -N-FENOKISAJINIIRU machine, Or it is -N-FENOCHIAJINIIRU and they are an unreplaced -N-KARUBAZORIIRU machine, an unreplaced -N-FENOKISAJINIIRU machine, or an unreplaced -N-FENOCHIAJINIIRU machine still more preferably.

[0023]- NAr_1Ar_2, $-NAr_3Ar_4$, and $-NAr_5Ar_6$ may form nitrogen-containing heterocycle, and, [as an example] For example, a -N-KARUBAZORIIRU machine, a 2-methyl N-KARUBAZORIIRU machine, A 3-methyl N-KARUBAZORIIRU machine, a 4-methyl N-KARUBAZORIIRU machine, A 3-n-butyl N-KARUBAZORIIRU machine, a 3-n-hexyl N-KARUBAZORIIRU machine, A 3-n-octyl N-KARUBAZORIIRU machine, a 3-n-******- N-KARUBAZORIIRU machine, 3, a 6-********-N-KARUBAZORIIRU machine, a 2-methoxy N-KARUBAZORIIRU machine, A 3-methoxy N-KARUBAZORIIRU machine, a 3-ethoxy N-KARUBAZORIIRU machine, A 3-isopropoxy N-KARUBAZORIIRU machine, a 3-n-butoxy N-KARUBAZORIIRU machine, A 3-n-octyloxy N-KARUBAZORIIRU machine, a 3-n-decyloxy N-KARUBAZORIIRU machine, a 3-phenyl N-KARUBAZORIIRU machine and 3-(4'-methylphenyl)- N-KARUBAZORIIRU machine and 3-(4'-tert-buthylphenyl)- N-KARUBAZORIIRU machine, a 3-chloro N-KARUBAZORIIRU machine, a -N-FENOKISAJINIIRU machine, and a -N-FENOCHIAJINIIRU machine. 2-methyl N-FENOCHIAJINIIRU etc. can be mentioned.

[0024]As an example of a compound denoted by the general formula (1) concerning this invention, although the following compounds can be mentioned, this invention is not limited to these, for example. The illustration compound number 1.2, 3, 4-tris [4'-(N and N-diphenylamino) phenyl] -5-phenylthio FEN 2.2, 3, 4-tris [4'-[N-phenyl N-(4"-methylphenyl) amino] phenyl] -5-phenylthio FEN 3.2, 3, 4-tris [4'-[N-phenyl N-(3"-methylphenyl) amino] phenyl] -5-phenylthio FEN 4.2, 3, 4-tris [4'-[N-phenyl N-(4"-ethyl phenyl) amino] phenyl] -5-phenylthio FEN 5.2, 3, 4-tris [4'-[N-phenyl N-(4"-tert-buthylphenyl) amino] phenyl] -5-phenylthio FEN 6.2, 3, 4-tris [4'-[N-(3"-methylphenyl)-N-(4"'-methylphenyl) amino] phenyl] -5-phenylthio FEN 7.2, 3, 4-tris [4'-[N-(2"-methylphenyl)-N-(4"'-cyclohexyl phenyl) amino] phenyl] -5-Feni

RUCHIOFEN 8.2, 3, 4-tris [4'-[N and N-JI (4"-methylphenyl) amino] phenyl] -5-phenylthio FEN 9.2, 3, 4-tris [4'-[N and N-JI (3"-methylphenyl) amino] phenyl] -5-phenylthio FEN 10.2, 3, 4-tris [4'-[N and N-JI (4"-ethyl phenyl) amino] phenyl] -5-phenylthio FEN

[0025]11. 2, 3, 4-tris [4'-[N and N-JI (4"-tert-buthylphenyl) amino] phenyl] -5-phenylthio FEN 12.2, 3, 4-tris [4'-[N-phenyl N-(2", 4"-dimethylphenyl) amino] phenyl] -5-phenylthio FEN 13.2, 3, 4-tris [4'-[N-phenyl N-(3", 4"-dimethylphenyl) amino] phenyl] -5-phenylthio FEN 14.2, 3, 4-tris [4'-[N and N-JI (3"5"-dimethylphenyl) amino] phenyl] -5-phenylthio FEN 15.2, 3-screw [4'-(N and N-diphenylamino) phenyl] -4-[4"-[N', an N'-JI (3"'-methylphenyl) amino] phenyl] -5-phenylthio FEN 16.2, 3-screw [4'-[N and N-JI (3"'-methylphenyl) amino] phenyl] -4-[4"-[N' and N'-JI (4""-methylphenyl) amino] phenyl] -5-phenylthio FEN 17.2, 3-screw [4'-[N-phenyl N-(4"'-methylphenyl) amino] phenyl] -4-[4"-[N', an N'-JI (3"'-methylphenyl) amino] phenyl] -5-phenylthio FEN 18.2, 4-screw [4'-[N-phenyl N-(3"'-methylphenyl) amino] phenyl] -3-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 19.2, 4-screw [4'-[N-phenyl N-(3"'-ethyl phenyl) amino] phenyl] -3-[4"-[N '- phenyl N'-(4""-methylphenyl) amino] phenyl] -5-phenylthio FEN 20.3, 4-screw [4'-(N and N-diphenylamino) phenyl] -2-[4"-[N'-phenyl N'-(3"'-methylphenyl) amino] phenyl] -5-phenylthio FEN

[0026]21. 3, 4-screw [4'-[N and N-JI (4"'-methylphenyl) amino] phenyl] -2-[4"-(N and N-diphenylamino) phenyl] -5-phenylthio FEN 22.2 - [4'-(N and N-diphenylamino) phenyl] -3-[4"-[N-phenyl N-(4""-ethyl phenyl) amino] phenyl] -4-[-- four -- " -- ' - [-- N -- ' - a phenyl -- N -- ' - (3""-methylphenyl) -- amino --] -- a phenyl --] -5-phenylthio FEN 23.2, 3, 4-tris [4'-[N-phenyl N-(4"-methoxypheny) amino] phenyl] -5-phenylthio FEN 24.2, 3, 4-tris [4'-[N-phenyl N-(3"-methoxypheny) amino] phenyl] -5-phenylthio FEN 25.2, 3, 4-tris [4'-[N-phenyl N-(4"-n-butoxy phenyl) amino] phenyl] -5-phenylthio FEN 26.2, 3, 4-tris [4'-[N-(3"-methylphenyl)-N-(4"'-n-hexyloxy phenyl) amino] phenyl] -5-phenylthio FEN 27.2, 3, 4-tris [4'-[N-(3"-methoxypheny)-N-(4"'-methoxypheny) amino] phenyl] -5-phenylthio FEN 28.2, 3, 4-tris [4'-[N and N-JI (4"-ethoxy phenyl) amino] phenyl] -5-phenylthio FEN 29.2, 3, 4-tris [4'-[N and N-JI (3"-methoxypheny) amino] phenyl] -5-phenylthio FEN 30.2, 3, 4-tris [4'-[N-phenyl N-(3"4"-dimethoxy phenyl) amino] phenyl] -5-phenylthio FEN

[0027]31. 2, 3, 4-tris [4'-[N and N-JI (3 "- methyl 5"-methoxypheny) amino] phenyl] -5-phenylthio FEN 32.2, 3-screw [4'-[N and N-JI (3"'-methylphenyl) amino] phenyl] -4-[4"-[N', an N'-JI (4""-methoxypheny) amino] phenyl] -5-phenylthio FEN 33.2, 4-screw [4'-[N-phenyl N-(3"'-

ethoxy phenyl) amino] phenyl] -3-[4"-[N '- phenyl N'-(3'"-methylphenyl) amino] phenyl] -5-phenylthio FEN 34.3, 4-screw [4'-(N and N-diphenylamino) phenyl] -2-[4"-[N'-phenyl N'-(3 '"-ethyl 5'"-methoxypheny) amino] phenyl] -5-phenylthio FEN 35.2, 3, 4-tris [4'-[N-phenyl N-(4"-fluoro phenyl) amino] phenyl] -5-phenylthio FEN 36.2, 3, 4-tris [4'-[N and N-JI (3"-fluoro phenyl) amino] phenyl] -5-phenylthio FEN 37.2, 3, 4-tris [4'-[N and N-JI (3 "- fluoro 2"-methylphenyl) amino] phenyl] -5-phenylthio FEN 38.2, 3-screw [4'-(N and N-diphenylamino) phenyl] -4-[4"-[N'-phenyl N'-(3'"-fluoro phenyl) amino] phenyl] -5-phenylthio FEN 39.2, 4-screw [4'-[N and N-JI (4'"-methoxypheny) amino] phenyl] -3-[4"-[N', an N'-JI (3'"-fluoro phenyl) amino] phenyl] -5-phenylthio FEN 40.2, 4-screw [4'-[N-phenyl N-(4'"-methylphenyl) amino] phenyl] -3-[4"-[N'-phenyl N'-(3'"-chlorophenyl) amino] phenyl] -5-phenylthio FEN

[0028]41. 3, 4-screw [4'-(N and N-diphenylamino) phenyl] -2-[4"-[N'-phenyl N'-(4'"-fluoro phenyl) amino] phenyl] -5-phenylthio FEN 42.2, 3, 4-tris [4'-[N-phenyl N-(4'"-phenyl phenyl) amino] phenyl] -5-phenylthio FEN 43.2, 3, 4-tris [4'-[N and N-JI (4"-phenyl phenyl) amino] phenyl] -5-phenylthio FEN 44.2, 4-screw [4'-[N and N-JI (4'"-methylphenyl) amino] phenyl] -3-[4"-[N '- phenyl N'-(4'"-phenyl phenyl) amino] phenyl] -5-phenylthio FEN 45.3, 4-screw [4'-[N and N-JI (3'"-phenyl phenyl) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 46.2, 3, 4-tris [4'-[N-phenyl N-(1"-Naff Chill) amino] phenyl] -5-phenylthio FEN 47.2, 3, 4-tris [4'-[N-phenyl N-(2"-Naff Chill) amino] phenyl] -5-phenylthio FEN 48.2, 3, 4-tris [4'-[N and N-JI (1"-Naff Chill) amino] phenyl] -5-phenylthio FEN 49.2, 3-screw [4'-[N-phenyl N-(1'"-Naff Chill) amino] phenyl] -4-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 50.3, 4-screw [4'-[N and N-JI (1'"-Naff Chill) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN

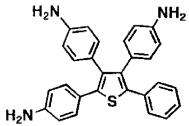
[0029]51. 3, 4-screw [4'-[N and N-JI (2'"-Naff Chill) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 52.2, 3, 4-tris [4'-[N-phenyl N-(9"-anthryl) amino] phenyl] -5-phenylthio FEN 53.3, 4-screw [4'-[N-(3'"-methylphenyl)-N-(9'"-anthryl) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 54.2, 3, 4-tris [4'-[N-phenyl N-(9"-phenan trill) amino] phenyl] -5-phenylthio FEN 55.3, 4-screw [4'-[N and N-JI (9'"-phenan trill) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 56.3, 4-screw [4'-[N-(4'"-methylphenyl)-N-(9'"-phenan trill) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 57.2, 3, 4-tris [4'-[N-phenyl N-(9", 9 "- ********- 2"-fluorenyl) amino] phenyl] -5-phenylthio FEN 58.3, 4-screw [4'-[N and N-JI ('9'", 9"[' - / ********-2']'-fluorenyl) amino] phenyl] -2-[4"-(N', N'-diphenylamino) phenyl] -5-phenylthio FEN 59.3, 4-screw [4'-[N-phenyl N-('9 '", 9'"[- ********-2]'-fluorenyl) amino] phenyl] -2-[4"-[N'-phenyl N'-(1'"-Naff Chill) amino] phenyl] -5-phenylthio FEN 60.2, 3, 4-tris [4'-[N-phenyl N-(2"-benzothiazolyl) amino] phenyl] -5-phenylthio FEN

[0030]61. 2, 3, 4-tris [4'-[N-phenyl N-(2"-thienyl) amino] phenyl] -5-phenylthio FEN 62.3, 4-screw [4'-(N and N-diphenylamino) phenyl] -2-[4"-[N '- phenyl N'-(4"'-pyridyl) amino] phenyl] -5-phenylthio FEN 63.2, 3, 4-tris [4'-(N-FENOKISAJINIIRU) phenyl] -5-phenylthio FEN 64.2, 3, 4-tris [4'-(N-KARUBAZORIIRU) phenyl] -5-phenylthio FEN 65.2, 3-screw [4'-(N-FENOCHIAJINIIRU) phenyl] -4-[4"-[N'-phenyl N'-(1"'-Naff Chill) amino] phenyl] -5-phenylthio FEN 66.3, 4-screw [4'-(N and N-diphenylamino) phenyl] -2-[4"-(N'-KARUBAZORIIRU) phenyl] -5-phenylthio FEN 67.3, 4-screw [4' - [N-phenyl N-(1"'-Naff Chill) amino] Phenyl] -2-[4"-(N'-KARUBAZORIIRU) phenyl] -5-phenylthio FEN 68.3, 4-screw [4'-(N-KARUBAZORIIRU) phenyl] -2-[4"-[N'-phenyl N'-(3"'-methylphenyl) phenylamino] phenyl] -5-phenylthio FEN

[0031]The compound denoted by the general formula (1) concerning this invention can be itself manufactured by a publicly known method. That is, it can manufacture by, for example, making the compound denoted by a general formula (2), and the compound denoted by the general formula (3) - a general formula (8) react under existence of a copper compound (for example, metal copper, a copper chloride) (Ullman reaction).

[0032]

[Chemical formula 4]



(2)

Ar_1-X_1 (3)

Ar_2-X_2 (4)

Ar_3-X_3 (5)

Ar_4-X_4 (6)

Ar_5-X_5 (7)

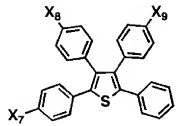
Ar_6-X_6 (8)

[X_1 - X_6 express a halogen atom among an upper type, and Ar_1 - Ar_6 express the same meaning as a general formula (1).]

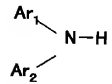
[0033]It can also manufacture by, for example, making the compound denoted by a general formula (9), and the compound denoted by the general formula (10) - a general formula (12) react under existence of a copper compound (for example, metal copper, a copper chloride) (Ullman reaction).

[0034]

[Chemical formula 5]



(9)



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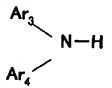
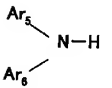


(11)



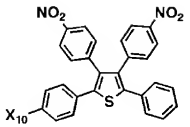
(12)

[X_7 - X_9 express a halogen atom among an upper type, and Ar_1 - Ar_6 express the same meaning as a general formula (1).]

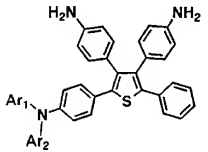
[0035][the compound denoted by a general formula (13), for example and the compound denoted by a general formula (10)] After making it react under existence of a copper compound (for example, metal copper, a copper chloride) (Ullman reaction), It can manufacture by returning a nitro group, and making the compound denoted by the general formula (5) - a general formula (8) react under existence of a copper compound (for example, metal copper, a copper chloride), after considering it as the compound denoted by a general formula (14) (Ullman reaction).

[0036]

[Chemical formula 6]



(13)



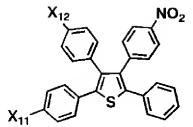
(14)

[X_{10} expresses a halogen atom among an upper type, and Ar_1 and Ar_2 express the same meaning as a general formula (1).]

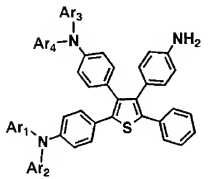
[0037]The compound denoted by a general formula (15), for example and the compound denoted by a general formula (10), and the compound denoted by a general formula (11) -- a copper compound (for example, metal copper.) A nitro group is returned after making it react under existence of a copper chloride (Ullman reaction), After considering it as the compound denoted by a general formula (16), it can manufacture by making the compound denoted by a general formula (7), and the compound denoted by a general formula (8) react under existence of a copper compound (for example, metal copper, a copper chloride) (Ullman reaction).

[0038]

[Chemical formula 7]



(15)



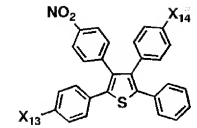
(16)

[X_{11} and X_{12} express a halogen atom among an upper type, and Ar_1 - Ar_4 express the same meaning as a general formula (1).]

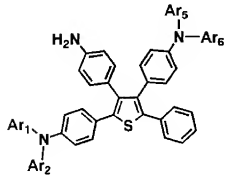
[0039]The compound denoted by a general formula (17), for example and the compound denoted by a general formula (10), and the compound denoted by a general formula (12) -- a copper compound (for example, metal copper.) A nitro group is returned after making it react under existence of a copper chloride (Ullman reaction), After considering it as the compound denoted by a general formula (18), it can manufacture by making the compound denoted by a general formula (5), and the compound denoted by a general formula (6) react under existence of a copper compound (for example, metal copper, a copper chloride) (Ullman reaction).

[0040]

[Chemical formula 8]



(17)



(18)

[X_{13} and X_{14} express a halogen atom among an upper type, and Ar_1, Ar_2, Ar_5, and Ar_6 express the same meaning as a general formula (1).]

[0041]Among an upper type, X_1 - X_{14} express a halogen atom, express a chlorine atom, a bromine atom, or iodine Harako, and express a bromine atom or iodine Harako more preferably.

[0042]An organic electroluminescence element usually pinches further at least the luminous layer which contains at least one sort of luminescence ingredients in inter-electrode [a pair of]. In consideration of each functional level of electron hole pouring of a compound and electron hole transportation, electronic pouring, and electronic transportation used for a luminous layer, the electronic pouring transportation layer containing the electron hole pouring transportation layer and/or electronic pouring transportation ingredient containing an electron hole pouring transportation ingredient can also be provided according to a request. For example, when the electron hole pouring function of the compound used for a luminous layer, an electron hole transportation function and/or an electronic pouring function, and an electronic transportation function are good, a luminous layer can have composition of the element of a

model which served both as the electron hole pouring transportation layer and/or the electronic pouring transportation layer. Of course, it can also have composition of the element (much more element of a model) of the model which does not provide the layer of both an electron hole pouring transportation layer and an electronic pouring transportation layer depending on the case. Each layer of an electron hole pouring transportation layer, an electronic pouring transportation layer, and a luminous layer may be structure much more, or may be multilayer structure, and in each layer, an electron hole pouring transportation layer and the electronic pouring transportation layer can provide separately the layer which has a pouring function, and the layer which has a transportation function, and can also constitute it.

[0043]In the organic electroluminescence element of this invention, as for the compound denoted by a general formula (1), it is preferred to use for an electron hole pouring transportation ingredient and/or a luminescence ingredient, and it is more preferred to use for an electron hole pouring transportation ingredient. In the organic electroluminescence element of this invention, the compound denoted by a general formula (1) may be used alone, or may be used together. [two or more]

[0044]Especially as composition of the organic electroluminescence element of this invention, it is not what is limited, For example, an electron hole pouring transportation layer / luminous layer / electronic pouring transportation layer / (A) anode / negative pole type element (drawing 1), (B) An anode / electron hole pouring transportation layer / luminous layer / negative pole type element (drawing 2), (C) anode / luminous layer / electronic pouring transportation layer / negative pole type element (drawing 3), (D) anode / luminous layer / negative pole type element (drawing 4), etc. can be mentioned. A luminous layer can also be used as (E) anode / electron hole pouring transportation layer / electronic pouring transportation layer / luminous layer / electronic pouring transportation layer / negative pole type element (drawing 5) which was put in the electronic pouring transportation layer and which is an element of a model. (D) Although the element of the model which made inter-electrode [a pair of] pinch a luminescence ingredient with a form further is natural as element composition of a model, The element of the model which it, for example, made inter-electrode [a pair of] pinch with the one-layer form which mixed (F) electron hole pouring transportation ingredient, the luminescence ingredient, and the electronic pouring transportation ingredient (drawing 6), (G) There is an element (drawing 8) of the model which it made inter-electrode [a pair of] pinch with the one-layer form which mixed the element (drawing 7) of the model which it made inter-electrode [a pair of] pinch with the one-layer form which mixed the electron hole pouring

transportation ingredient and the luminescence ingredient, (H) luminescence ingredient, and the electronic pouring transportation ingredient.

[0045]The organic electroluminescence element of this invention cannot be restricted to these element composition, and an electron hole pouring transportation layer, a luminous layer, and a two or more layers electronic pouring transportation layer can be provided in each type of element. In each type of element, the mixed layer of a luminescence ingredient and an electronic pouring transportation ingredient can also be provided between an electron hole pouring transportation layer and a luminous layer between the mixed layer of an electron hole pouring transportation ingredient and a luminescence ingredient and/or a luminous layer, and an electronic pouring transportation layer. The composition of a more desirable organic electroluminescence element is (A) model element, (B) model element, (E) model element, (F) model element, or (G) model element, and is (A) model element, (B) model element, or (G) model element still more preferably.

[0046]As an organic electroluminescence element of this invention, the electron hole pouring transportation layer / luminous layer / electronic pouring transportation layer / (A) anode / negative pole type element shown in (drawing 1) are explained, for example. in (drawing 1) -- 1 -- a substrate and 2 -- a luminous layer and 5 show an electronic pouring transportation layer, 6 shows the negative pole, and, as for an electron hole pouring transportation layer and 4, an anode and 3 show a power supply 7.

[0047]As for the organic electroluminescence element of this invention, being supported by the substrate 1 is preferred, and, [as a substrate] Although it does not limit in particular, the transparent translucent thing which is and carries out is preferred, for example, a glass board and a transparent plastic sheet (for example, polyester.) What consists of a composite sheet which combined sheets, such as polycarbonate, polysulfone, poly methyl methacrylate, polypropylene, and polyethylene, a translucent plastic sheet, quartz, transparent Ceramics Sub-Division, or these can be mentioned. A luminescence color is also controllable to a substrate combining a color filter film, a color conversion film, and a dielectric reflection film, for example.

[0048]It is preferred to use metal with a comparatively large work function, an alloy, or an

electric conductivity compound as an electrode substance as the anode 2. As an electrode substance used for an anode, gold, platinum, silver, copper, cobalt, nickel, palladium, vanadium, tungsten, tin oxide, a zinc oxide, ITO (indium Tin oxide), poly CHIOFEN, polypyrrole, etc. can be mentioned, for example. These electrode substances may be used alone or may be used together. [two or more] The anode can form these electrode substances on a substrate by methods, such as the vapor-depositing method and the sputtering method, for example. An anode may be structure much more or may be multilayer structure. Below hundreds of ohms / ** set the sheet electrical resistance of an anode as 5-50ohms / ** grade more preferably. Although the thickness of an anode is based also on the material of the electrode substance to be used, generally it is more preferably set as about 10-500 nm about 5-1000 nm.

[0049]The electron hole pouring transportation layer 3 is a layer containing the compound which has the function to convey the electron hole which makes easy pouring of the electron hole (hole) from an anode, and which was functioned and poured in. The compound which has the compound and/or other electron hole pouring transportation functions in which an electron hole pouring transportation layer is denoted by a general formula (1). for example, a phthalocyanine derivative and doria -- a reel methane derivative and doria -- a reel amine derivative. It can form using an OKISAZORU derivative, a hydrazone derivative, a SUCHIRUBEN derivative, a pyrazoline derivative, a polysilane derivative, poly phenylenevinylene and its derivative, poly CHIOFEN and its derivative, a poly-N-vinylcarbazole derivative, etc. at least one sort. The compound which has an electron hole pouring transportation function may be used alone, or may be used together. [two or more] In the organic electroluminescence element of this invention, it is preferred to contain the compound expressed with a general formula (1) to an electron hole pouring transportation layer.

[0050]as the compound which has other electron hole pouring transportation functions to use in this invention -- doria -- a reel amine derivative (for example, 4 and 4'-screw) [N-phenyl N-(4"-methylphenyl) amino] Biphenyl, 4, and 4'-screw [N-phenyl N-(3"-methylphenyl) amino] Biphenyl, 4, and 4'-screw [N-phenyl N-(3"-methoxypheny) amino] Biphenyl, 4, and 4'-screw [N-phenyl N-(1"-Naff Chill) amino] Biphenyl, 3, a 3 '- ********- 4 and 4'-screw [N-phenyl N-(3"-methylphenyl) amino] Biphenyl, 1, and 1-screw [4'-[N and N-JI (4"-methylphenyl) amino] phenyl] Cyclohexane, 9, 10-screw [N-(4'-methylphenyl)-N-(4"-n-buthylphenyl) amino] Phenanthrene, 3, 8-bis(N and N-diphenylamino)-6-phenyl phenanthridine, the 4-methyl N, N-screw [-- four -- " -- four -- " -- ' - a screw -- [-- N -- ' -- N -- ' - JI (4-methylphenyl) -- amino --] --

biphenyl -- four - IRU --] Aniline, N, and N'-screw [4-(diphenylamino) phenyl] -N and N'-diphenyl 1, 3-Gia Minot Ben Senn, N, N'-screw [4-(diphenylamino) phenyl] -The N and N'-diphenyl 1, 4-Gia Minot Ben Senn, 5, a 5"-screw [4-(bis[4-methylphenyl] amino) phenyl] -two -- two -- ' -- : -- five -- ' -- two -- " - TACHIOFEN -- one -- three -- five - tris (diphenylamino) -- benzene -- four -- four -- ' -- four -- " - tris (N-KARUBAZORIIRU) -- a bird -- phenylamine -- four -- four -- ' -- four -- " - tris [N-(3"'-methylphenyl)-N-phenylamino] Bird phenylamine, 4, 4', 4"-tris [N and N-bis(4"'-tert-butyl biphenyl 4""-IRU)amino] Bird phenylamine, 1 and 3, 5-tris [N-(4'-diphenyl aminophenyl)-N-phenylamino] The benzene of poly CHIOFEN and its derivative, and a poly-N-vinylcarbazole derivative, etc. are more preferred.

[0051]When using together the compound denoted by a general formula (1), and the compound which has other electron hole pouring transportation functions, [the rate of a compound denoted by the general formula (1) occupied in an electron hole pouring transportation layer] Preferably, it prepares to about 5 to 95weight % especially about 1 to 99weight % still more preferably about 0.1 to 99.9weight % 0.1weight % or more.

[0052]The luminous layer 4 is a layer containing the compound which has an electron hole and electronic pouring functions, those transportation functions, and the function to make re-combination of an electron hole and an electron generate an exciton. The compound which has the compound and/or other luminescence functions in which a luminous layer is denoted by a general formula (1) (for example, an AKURIDON derivative, a cinchona bark KURIDON derivative, a diketo pyrrolo pyrrole derivative, a polyaromatic compound) [For example, rubrene, anthracene, TETORASEN, pyrene, PERIREN, KURISEN, a DEKASHI crane, KORONEN, tetra-phenyl cyclo PENTAJIEN, PENTA phenyl cyclo PENTAJIEN, 9, 10-diphenyl anthracene, 9, 10-bis(phenyl ECHINIRU)anthracene, 1, 4-bis(9'-ECHINIRU anthracenyl) benzene, 4, and 4'-bis(9"-ECHINIRU anthracenyl)biphenyl] doria -- a reel amine derivative [For example, the compound mentioned above as a compound which has an electron hole pouring transportation function can be mentioned.] Organic metal complex [For example, tris (8-quinolate) aluminum, bis(10-benzo[h] quinolate)beryllium, 2-(2'-hydroxyphenyl) BENZOOKI Southall's zinc salt, the zinc salt of 2-(2'-hydroxyphenyl) benzothia ZORU, The zinc salt of 4-hydroxy AKURIJIN, the zinc salt of 3-hydroxy FURABON, beryllium salt of 5-hydroxy FURABON, aluminum salt of 5-hydroxy FURABON] SUCHIRUBEN derivative [For example, -bis(2 and 2-diphenyl vinyl)biphenyl, and 1, 1, 4, and 4-tetra-phenyl 1, 3-butadiene, 4, and 4 '4, 4' bis[-] [(1, 1, 2-bird phenyl) ethenyl] biphenyl] **

[0053]Coumarin derivative[for example, Kumarin 1, Kumarin 6, Kumarin 7, Kumarin 30, Kumarin 106, Kumarin 138, Kumarin 151, Kumarin 152, Kumarin 153, Kumarin 307, Kumarin 311, Kumarin 314, Kumarin 334, Kumarin 338, Kumarin 343, Kumarin 500] Pyran derivativeFor example, [DCM1, DCM2] Oxazone derivative[For example, Nile red] A benzothia ZORU derivative, a BENZOOKI Southall derivative, a benzimidazole derivative, A pyrazine derivative, a cinnamic acid ester derivative, poly-N-vinylcarbazole, and its derivative, Poly CHIOFEN and its derivative, poly phenylene, and its derivative, Poly full OREN and its derivative, poly phenylenevinylene, and its derivative, It can form using PORIBI phenylenevinylene and its derivative, PORITA phenylenevinylene and its derivative, poly naphthylene BINIREN and its derivative, poly thienylene BINIREN, its derivative, etc. at least one sort.

[0054]In the organic electroluminescence element of this invention, it is preferred to contain the compound expressed with a general formula (1) to a luminous layer. When using together the compound denoted by a general formula (1), and the compound which has other luminescence functions, the rate of a compound denoted by the general formula (1) occupied in a luminous layer is preferably prepared to about 0.001 to 99.999weight %.

[0055]As a compound which has other luminescence functions to use in this invention, a polyaromatic compound and a luminescent organic metal complex are more preferred. For example, a luminous layer can also consist of a host compound and a guest compound (dopant) like a description in J. Appl. Phys., 65 and 3610 (1989), and JP,H5-214332,A. A luminous layer can be formed for the compound denoted by a general formula (1) as a host compound, and also a luminous layer can also be formed as a guest compound. When forming a luminous layer for the compound denoted by a general formula (1) as a host compound, as a guest compound, the compound which has other aforementioned luminescence functions can be mentioned, for example, and a polyaromatic compound is especially preferred. In this case, to the compound denoted by a general formula (1), the compound which has other luminescence functions is twisted and is used about 0.1 to 20weight % still more preferably about 0.01 to 30weight % preferably about 0.001 to 40weight %.

[0056][as a polyaromatic compound used together with the compound denoted by a general formula (1)] Although it does not limit in particular, for example Rubrene, anthracene,

TETORASEN, Pyrene, PERIREN, KURISEN, a DEKASHI crane, KORONEN, tetra-phenyl cyclo PENTAJIEN, PENTA phenyl cyclo PENTAJIEN, 9, 10-diphenyl anthracene, 9, 10-bis (phenyl ECHINIRU)anthracene, 1, 4-bis(9'-ECHINIRU anthracenyl)benzene, 4, and 4'-bis(9"-ECHINIRU anthracenyl)biphenyl etc. can be mentioned. Of course, a polyaromatic compound may be used alone or may be used together. [two or more]

[0057]When forming a luminous layer, using the compound denoted by a general formula (1) as a guest compound, as a host compound, a luminescent organic metal complex is preferred. In this case, to a luminescent organic metal complex, the compound denoted by a general formula (1) is twisted, and is used about 0.1 to 20weight % still more preferably about 0.01 to 30weight % preferably about 0.001 to 40weight %.

[0058]Especially as a luminescent organic metal complex used together with the compound denoted by a general formula (1), although it does not limit, a luminescent organic aluminium complex is preferred and the luminescent organic aluminium complex in which at least 8-quinolate ** which is not replaced [substitution or] has a child is more preferred. As a luminescent desirable organic metal complex, the luminescent organic aluminium complex denoted by the general formula (a) - a general formula (c) can be mentioned, for example.

[0059](Q) (a) (as for Q, at least 8-quinolate ** which is not replaced [substitution or] expresses child among formula) $(Q)_2$-aluminum-O-L_3-aluminum (b) () [among a formula] $(Q)_2$-aluminum-O-aluminum-$(Q)_2$ (c) (as for Q, at least substitution 8-quinolate ** expresses a child among a formula) which, as for Q, at least substitution 8-quinolate ** expresses a child, and at least phenolate ** of O-L is a child and expresses the hydrocarbon group of the carbon numbers 6-24 in which L contains a phenyl portion

[0060]As an example of a luminescent organic metal complex, for example Tris (8-quinolate) aluminum, Tris (4-methyl 8-quinolate) aluminum, tris (5-methyl 8-quinolate) aluminum, Tris (3, 4-********- 8-quinolate) aluminum, tris (4, 5-********- 8-quinolate) aluminum, tris (4, 6-********- 8-quinolate) aluminum,

[0061]Bis(2-methyl 8-quinolate)(phenolate) aluminum, Bis(2-methyl 8-quinolate)(2-methyl

phenolate) aluminum, Bis(2-methyl 8-quinolate)(3-methyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(4-methyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2-phenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(3-phenyl phenolate) aluminum, Bis(2-methyl 8-quinolate) (4-phenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 3-JIMECHIRU phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 6-JIMECHIRU phenolate) aluminum, Bis(2-methyl 8-quinolate)(3, 4-JIMECHIRU phenolate) aluminum, Bis(2-methyl 8-quinolate)(3, 5-JIMECHIRU phenolate) aluminum, bis(2-methyl 8-quinolate)(3, 5-G tert-butyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 6-diphenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 4, 6-bird phenyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 4, 6-bird methyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(2, 4, 5, 6-tetramethyl phenolate) aluminum, Bis(2-methyl 8-quinolate)(1-naphth RATO) aluminum, Bis(2-methyl 8-quinolate)(2-naphth RATO) aluminum, Bis(2, 4-********- 8-quinolate)(2-phenyl phenolate) aluminum, Bis(2, 4-********- 8-quinolate)(3-phenyl phenolate) aluminum, Bis(2, 4-********- 8-quinolate)(4-phenyl phenolate) aluminum, Bis (2, 4-********- 8-quinolate)(3, 5-JIMECHIRU phenolate) aluminum, bis(2, 4-********- 8-quinolate) (3, 5-G tert-butyl phenolate) aluminum,

[0062]Bis(2-methyl 8-quinolate)aluminum mu-oxo bis(2-methyl 8-quinolate)aluminum, Bis(2, 4-********- 8-quinolate)aluminum mu-oxo bis(2, 4-********- 8-quinolate)aluminum, Bis(2-methyl 4-ethyl 8-quinolate)aluminum mu-oxo bis(2-methyl 4-ethyl 8-quinolate)aluminum, Bis(2-methyl 4-methoxy 8-quinolate)aluminum mu-oxo bis(2-methyl 4-methoxy 8-quinolate)aluminum, Bis(2-methyl 5-cyano 8-quinolate)aluminum mu-oxo bis(2-methyl 5-cyano 8-quinolate)aluminum, Bis (2-methyl 5-trifluoromethyl 8-quinolate)aluminum mu-oxo bis(2-methyl 5-trifluoromethyl 8-quinolate)aluminum etc. can be mentioned. Of course, a luminescent organic metal complex may be used alone, or may be used together. [two or more]

[0063]The electronic pouring transportation layer 5 is a layer containing the compound which has the function to convey the electron which makes pouring of the electron from the negative pole easy, and which was functioned and poured in. As a compound which has an electronic pouring transportation function used for an electronic pouring transportation layer, it is an organic metal complex, for example. [For example, tris (8-quinolate) aluminum, bis(10-benzo [h] quinolate)beryllium, beryllium salt of 5-hydroxy FURABON, aluminum salt of 5-hydroxy FURABON] Oxadiazole derivative [For example, 1 and 3-bis[5'-(p-tert-buthylphenyl)-1, 3, and 4-oxadiazole 2'-IRU] benzene] Bird azole derivative [-- For example, 3-(4'-tert-buthylphenyl)-4-phenyl 5-(4"-biphenyl)-1, and 2 and 4 - doria ZORU] A triazine derivative, a PERIREN derivative, a quinoline derivative, a quinoxaline derivative, a diphenyl quinone derivative, a

nitroglycerine substitution fluorenone derivative, a thiopyran dioxide derivative, etc. can be mentioned. The compound which has an electronic pouring transportation function may be used alone, or may be used together. [two or more]

[0064]It is preferred to use metal with a comparatively small work function, an alloy, or an electric conductivity compound as an electrode substance as the negative pole 6. As an electrode substance used for the negative pole, for example Lithium, a lithium indium alloy, Sodium, a sodium potassium alloy, calcium, magnesium, A magnesium silver alloy, a magnesium indium alloy, indium, RUTENIUMU, titanium, manganese, yttrium, aluminum, an aluminium-lithium alloy, an aluminum calcium alloy, an aluminum Magnesium alloy, a graphite thin film, etc. can be mentioned. These electrode substances may be used alone or may be used together. [two or more] The negative pole can form these electrode substances on an electronic pouring transportation layer by methods, such as the vapor-depositing method, the sputtering method, the ionization vapor-depositing method, the ion plating method, and the cluster ion beam method, for example. The negative pole may be structure much more, or may be multilayer structure. As for the sheet electrical resistance of the negative pole, it is preferred to set to below hundreds of ohms / **. Although the thickness of the negative pole is based also on the material of the electrode substance to be used, generally it is more preferably set as about 10-500 nm about 5-1000 nm. In order to take out luminescence of an organic electroluminescence element efficiently, the translucent thing with at least one transparent electrode of an anode or the negative pole which is and carries out is preferred, and it is more preferred to set up the material of an anode and thickness generally, so that the transmissivity of luminescence light may be not less than 70%.

[0065]moreover -- in the organic electroluminescence element of this invention -- the -- the singlet oxygen quencher may contain in inside further at least. Especially as a singlet oxygen quencher, it does not limit, rubrene, a nickel complex, diphenyl iso benzofuran, etc. are mentioned, for example, and it is rubrene especially preferably. Especially as a layer which the singlet oxygen quencher contains, although it does not limit, it is a luminous layer or an electron hole pouring transportation layer, and is an electron hole pouring transportation layer more preferably. For example, when making an electron hole pouring transportation layer contain a singlet oxygen quencher, it may be made to contain uniformly in an electron hole pouring transportation layer, and may be made to contain near an electron hole pouring transportation layer and the adjoining layer (for example, a luminous layer, the electronic pouring transportation layer which has a luminescence function). 0.01- of the amount of whole

which constitutes the layer (for example, electron hole pouring transportation layer) to contain as content of a singlet oxygen quencher -- it is 0.1 to 20 weight % more preferably 0.05 to 30weight % 50weight %.

[0066][about the formation method of an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer] Not the thing limited especially but a vacuum evaporation method, the ionization vapor-depositing method, It is producible by forming a thin film by the solution applying methods (for example, a spin coat method, the cast method, a dip coating method, the bar coat method, the roll coat method, a Langmuir-Blodgett method, the ink-jet method, etc.). When forming each layer by a vacuum evaporation method, [the conditions of vacuum deposition] Although it does not limit in particular, it is preferred under the vacuum below a 10^{-5}Torr grade to carry out at about 0.005-50nm/sec vapor deposition speed with the boat temperature (source temperature of vapor deposition) of about 50-600 ** and about [-50-300 **] substrate temperature. In this case, each layers, such as an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer, can manufacture the organic electroluminescence element which was further excellent in many characteristics by forming continuously under a vacuum. When forming each layers, such as an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer, by a vacuum evaporation method using two or more compounds, it is preferred to carry out temperature control individually and to carry out vapor codeposition of each boat into which the compound was put.

[0067]By the solution applying method, when you form each layer, a solvent is dissolved or distributed and let the ingredient which forms each layer, its ingredient, binder resin, etc. be coating liquid. [as binder resin which can be used for each layer of an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer] For example, poly-N-vinylcarbazole, poly arylate, polystyrene, Polyester, Pori Shiroki Sun, polymethyl acrylate, poly methyl methacrylate, Polyether, polycarbonate, polyamide, polyimide, polyamide imide, Poly paraxylene, polyethylene, polyethylene ether, polypropylene ether, Poly phenylene oxide, polyether sulphone, poly aniline, and its derivative, High molecular compounds, such as poly CHIOFEN and its derivative, poly phenylenevinylene and its derivative, poly full OREN and its derivative, poly thienylene BINIREN, and its derivative, are mentioned. Binder resin may be used alone or may be used together. [two or more]

[0068]When forming each layer by the solution applying method, [the ingredient which forms each layer, its ingredient, binder resin etc.] a suitable organic solvent (for example, hexane, octane, Deccan, and toluene.) Hydrocarbon system solvents, such as xylene, ethyl benzene, and 1-methylnaphthalene, For example, acetone, methyl ethyl ketone, methyl isobutyl ketone, Ketone solvent, for example, dichloromethane, such as cyclohexanone, chloroform, Tetra-chloro methane, dichloro ethane, trichloroethane, tetra-chloro ethane, Halogenated hydrocarbon system solvents, such as chlorobenzene, dichlorobenzene, and chloro toluene, For example, ester solvent, such as ethyl acetate, butyl acetate, and amyl acetate, For example, methanol, ethanol, propanol, butanol, pen TANORU, HEKISANORU, cyclohexanol, methyl cellosolve, ethylcellosolve, Alcoholic solvent, for example, dibutyl ether, such as ethylene glycol, Ether system solvent [, such as a tetrahydro franc, dioxane, and ANISORU,], for example, N, and N-JIMECHIRU formamide, N, and N-JIMECHIRU aceto amide, a 1-methyl 2-pylori boss, 1, 3-********- 2-imidazolidinone, A polar solvent and/or water, such as dimethyl sulfoxide, can be dissolved or distributed, it can be considered as coating liquid, and a thin film can be formed by various kinds of applying methods.

[0069]Although it does not limit especially as a method of distributing, it can distribute in the shape of a particulate using a ball mill, SANDOMIRU, a paint shaker, attritor, a homogenizer, etc., for example. It cannot limit, can set to the density range which was suitable for producing desired thickness by the applying method to enforce, especially concerning the concentration of coating liquid, and, generally is about 1 to 30weight % of solution concentration preferably about 0.1 to 50weight %. Concerning the amount used, when using binder resin, Although it does not limit in particular, generally it sets up to about 15 to 90weight % more preferably about 10 to 99weight % about 5 to 99.9weight % to the ingredient which forms each layer (receiving the total amount of each ingredient, in forming the element of a model further).

[0070]Although it does not limit especially concerning the film thickness of an electron hole pouring transportation layer, a luminous layer, and an electronic pouring transportation layer, generally it is preferred to set it as 5 nm - about 5 micrometers. [the purpose of preventing contact with oxygen, moisture, etc. to the produced element] A protection layer (closure layer) can be provided, and an element can be enclosed in inactive substances, such as paraffine, a liquid paraffin, silicone oil, fluorocarbon oil, and zeolite content fluorocarbon oil, for example, and can be protected.

[0071]As a material used for a protection layer, for example An organic polymer material. for example, fluorination resin, an epoxy resin, silicone resin, and epoxy silicone resin. Polystyrene, polyester, polycarbonate, polyamide, polyimide, Polyamide imide, poly paraxylene, polyethylene, poly phenylene oxide, The material which can mention the charge of non-equipments (for example, diamond film, amorphous silica, and electrical-insulation-properties glass, a metal oxide, metal nitride, a metal carbonation thing, metallic sulfide), a photo-setting resin, etc., and is used for a protection layer may be used alone, or may be used together. [two or more] A protection layer may be structure much more, and may be multilayer structure.

[0072]A metal oxide film (for example, aluminum oxide film) and a metal fluoridation film can also be provided in an electrode as a protective film, for example. For example, the interface layer (intermediate layer) which comprises an organophosphorus compound, polysilane, an aromatic amine derivative, a phthalocyanine derivative (for example, copper phthalocyanine), and carbon can also be provided on the surface of an anode. An electrode, for example, an anode, can also process and use the surface with acid, ammonia/hydrogen peroxide, or plasma, for example.

[0073]Generally, the organic electroluminescence element of this invention can be used also as a pulse drive type or alternating current drive type element, although used as a direct-current drive type element. Generally impressed electromotive force is about 2-30V. The organic electroluminescence element of this invention can be used for a panel type light source, various kinds of light emitting elements, various kinds of display elements, various kinds of signs, various kinds of sensors, etc., for example.

[0074]

[Working example]Hereafter, although a work example explains this invention still in detail, of course, this invention is not limited to these.

[0075]The glass substrate which has an ITO transparent electrode (anode) with a work-example 1 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone,

and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. First, it is 2, 3, and 4-tris on an ITO transparent electrode. [4'-(N and N-diphenylamino) phenyl] -5-phenylthio FEN (compound of the illustration compound number 1) was vapor-deposited in thickness of 75 nm at 0.2nm/sec in vapor deposition speed, and was made into the electron hole pouring transportation layer. Subsequently, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed on it, and it was considered as the luminous layer which served as the electronic pouring transportation layer. On it, as the negative pole, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, it was considered as the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Direct-current voltage was impressed to the produced organic electroluminescence element, and the continuation drive was carried out by the constant current density of 10 mA / cm^2 under 50 ** and dry atmosphere. In early stages, green luminescence of 6.5V and luminosity 520 cd/m^2 was checked. The half-life of luminosity was 670 hours.

[0076]In the two to work-example 22 work example 1, formation of an electron hole pouring transportation layer is faced, Instead of using the compound of the illustration compound number 1, the compound of the illustration compound number 4 (work example 2), The compound (work example 3) of the illustration compound number 9, the compound of the illustration compound number 13 (work example 4), The compound (work example 5) of the illustration compound number 15, the compound of the illustration compound number 18 (work example 6), The compound (work example 7) of the illustration compound number 20, the compound of the illustration compound number 24 (work example 8), The compound (work example 9) of the illustration compound number 32, the compound of the illustration compound number 34 (work example 10), The compound (work example 11) of the illustration compound number 38, the compound of the illustration compound number 41 (work example 12), The compound (work example 13) of the illustration compound number 42, the compound of the illustration compound number 45 (work example 14), The compound (work example 15) of the illustration compound number 46, the compound of the illustration compound number 50 (work example 16), The compound (work example 17) of the illustration compound number 52, the compound of the illustration compound number 55 (work example 18), [except having used the compound (work example 19) of the illustration compound number 57, the compound (work example 20) of the illustration compound number 58, the compound (work example 21)

of the illustration compound number 64, and the compound (work example 22) of the illustration compound number 66] The organic electroluminescence element was produced by the method of the description in the work example 1. Green luminescence was checked from each element. The characteristic was investigated and the result was shown in (the 1st table).

[0077]It is 2, 3, and 5-tris instead of using the compound of the illustration compound number 1 when forming an electron hole pouring transportation layer in the one to comparative example 3 work example 1. [4'-(N and N-diphenylamino) phenyl] -4-phenylthio FEN (comparative example 1), 2 and 3, 5-tris [4'-[N and N-JI (3"-methylphenyl) amino] phenyl] -4-phenylthio FEN (comparative example 2), 3 - [4'-(N, N diphenylamino) phenyl] -2, 5-screw [4"-[N'-phenyl N'-(3"'-methylphenyl) amino] phenyl] -Except having used 4-phenylthio FEN (comparative example 3), the organic electroluminescence element was produced by the method of the description in the work example 1. Green luminescence was checked from each element. The characteristic was investigated and the result was shown in the 1st table.

[0078]

[Table 1]

第１表

有機電界発光素子	初期特性 輝度 (cd／m²)	電圧 (V)	半減期 (hr)
実施例２	５４０	６．７	６６０
実施例３	５５０	６．８	６５０
実施例４	５６０	６．６	６６０
実施例５	５６０	６．８	６５０
実施例６	５４０	６．７	６７０
実施例７	５７０	６．８	６６０
実施例８	５６０	６．４	６３０
実施例９	５４０	６．５	６５０
実施例１０	５５０	６．５	６８０
実施例１１	５７０	６．７	６４０
実施例１２	５８０	６．８	６５０
実施例１３	５９０	６．６	６８０
実施例１４	５７０	６．８	６７０
実施例１５	５６０	６．７	６２０
実施例１６	５８０	６．８	６６０
実施例１７	５６０	６．４	６３０
実施例１８	５７０	６．５	６５０

[0079]

[Table 2]

第１表（続き）

有機電界発光素子	初期特性 輝度（cd／m²）	電圧（V）	半減期（hr）
実施例１９	５８０	６．７	６４０
実施例２０	５６０	６．８	６５０
実施例２１	５９０	６．６	６６０
実施例２２	５６０	６．８	６５０
比較例１	４７０	６．４	５１０
比較例２	４５０	６．５	５２０
比較例３	４７０	６．５	５１０

[0080]The glass substrate which has an ITO transparent electrode (anode) with a work-example 23 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. First, on the ITO transparent electrode, at 0.1nm/sec in vapor deposition speed, poly (**********- 2, 5-diyl) was vapor-deposited in thickness of 20 nm, and was made into the first electron hole pouring transportation layer. Subsequently, the compound of the illustration compound number 3 was vapor-deposited in thickness of 55 nm at 0.2nm/sec in vapor deposition speed, and was made into the second electron hole pouring transportation layer. Subsequently, tris (8-KINORINORA note) aluminum

was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed on it, and it was considered as the luminous layer which served as the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, it was considered as the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Direct-current voltage was impressed to the produced organic electroluminescence element, and the continuation drive was carried out by the constant current density of 10 mA / cm^2 under dry atmosphere. In early stages, green luminescence of 6.5V and luminosity 700 cd/m^2 was checked. The half-life of luminosity was 1350 hours.

[0081]The glass substrate which has an ITO transparent electrode (anode) with a work-example 24 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. First, they are 4, 4', and 4"-tris on an ITO transparent electrode. [N-(3"'-methylphenyl)-N-phenylamino] At 0.1nm/sec in vapor deposition speed, bird phenylamine was vapor-deposited in thickness of 50 nm, and was made into the first electron hole pouring transportation layer. Subsequently, vapor codeposition (weight ratio 10:1) of the compound and rubrene of the illustration compound number 21 was carried out to a thickness of 20 nm at 0.2nm/sec in vapor deposition speed from a different evaporation source, and it was considered as the luminous layer which served as the second electron hole pouring transportation layer. Subsequently, on it, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and it was considered as the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, it was considered as the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Direct-current voltage was impressed to the produced organic electroluminescence element, and the continuation drive was carried out by the constant current density of 10 mA / cm^2 under dry atmosphere. In early stages, luminescence of the yellow of 6.1V and luminosity 680 cd/m^2 was checked. The half-life of luminosity was 1280 hours.

[0082]The glass substrate which has an ITO transparent electrode (anode) with a work-example 25 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. First, on the ITO transparent electrode, at 0.1nm/sec in vapor deposition speed, poly (**********- 2, 5-diyl) was vapor-deposited in thickness of 20 nm, and was made into the first electron hole pouring transportation layer. After returning a vapor deposition tub under atmospheric pressure, the vapor deposition tub was again decompressed to $3x10^{-6}$Torr. Subsequently, vapor codeposition (weight ratio 10:0.5) of the compound and DEKASHI crane of the illustration compound number 44 was carried out to a thickness of 55 nm at 0.2nm/sec in vapor deposition speed from a different evaporation source, and it was considered as the luminous layer which served as the second electron hole pouring transportation layer. With the decompression state maintained, it ranked second, and on it, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed, and it was considered as the electronic pouring transportation layer. With the decompression state maintained, on it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Direct-current voltage was impressed to the produced organic electroluminescence element, and the continuation drive was carried out by the constant current density of 10 mA / cm^2 under dry atmosphere. In early stages, green luminescence of 6.3V and luminosity 660 cd/m^2 was checked. The half-life of luminosity was 1430 hours.

[0083]The glass substrate which has an ITO transparent electrode (anode) with a work-example 26 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone, and ethanol. After having dried the substrate using nitrogen gas, and also UV / carrying out an ozone wash and fixing to the substrate holder of an evaporation apparatus, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. First, on the ITO transparent electrode, at 0.1nm/sec in vapor deposition speed, the compound of the illustration compound number 48 was vapor-deposited in thickness of 20 nm, and was made into the first electron hole pouring transportation layer. Subsequently, vapor codeposition (weight ratio 10:1) of the compound and rubrene of the illustration compound number 68 was carried out to a thickness of 55 nm at 0.2nm/sec in vapor deposition speed from a different evaporation source, and it was considered as the luminous layer which served as the second electron hole pouring transportation layer. On it, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50

nm at 0.2nm/sec in vapor deposition speed, and it was considered as the electronic pouring transportation layer. On it, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, they were made into the negative pole, and the organic electroluminescence element was produced. Vapor deposition was carried out with the decompression state of a vapor deposition tub maintained. Direct-current voltage was impressed to the produced organic electroluminescence element, and the continuation drive was carried out by the constant current density of 10 mA / cm^2 under dry atmosphere. In early stages, luminescence of the yellow of 6.2V and luminosity 700 cd/m^2 was checked. The half-life of luminosity was 1650 hours.

[0084]The glass substrate which has an ITO transparent electrode (anode) with a work-example 27 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone, and ethanol. It dried using nitrogen gas, and also UV/ozone wash carried out the substrate. Next, the compound of polycarbonate (weight average molecular weight 50000) and the illustration compound number 5 was made into a 40-nm electron hole pouring transportation layer with the dip coating method on the ITO transparent electrode using the 3 weight % dichloro ethane solution contained at a rate of the weight ratio 100:50. Next, after fixing to the substrate holder of an evaporation apparatus the glass substrate which has this electron hole pouring transportation layer, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. Subsequently, tris (8-quinolate) aluminum was vapor-deposited in thickness of 50 nm at 0.2nm/sec in vapor deposition speed on it, and it was considered as the luminous layer which served as the electronic pouring transportation layer. On the luminous layer, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, it was considered as the negative pole, and the organic electroluminescence element was produced. Under dry atmosphere, when the direct-current voltage of 10V was impressed to the produced organic electroluminescence element, the current of 95 mA / cm^2 flowed into it. Green luminescence of luminosity 1350 cd/m^2 was checked. The half-life of luminosity was 320 hours.

[0085]The glass substrate which has an ITO transparent electrode (anode) with a work-example 28 thickness of 200 nm was cleaned ultrasonically using neutral detergent, acetone, and ethanol. It dried using nitrogen gas, and also UV/ozone wash carried out the substrate. On an ITO transparent electrode, next, poly methyl methacrylate (weight average molecular

weight 25000), A 100-nm luminous layer was formed with the dip coating method using the 3 weight % dichloro ethane solution which contains the compound of the illustration compound number 26, and tris (8-quinolate) aluminum at a rate of the weight ratio 100:50:0.5, respectively. Next, after fixing to the substrate holder of an evaporation apparatus the glass substrate which has this luminous layer, the vapor deposition tub was decompressed to $3x10^{-6}$Torr. On the luminous layer, vapor codeposition (weight ratio 10:1) of magnesium and the silver was carried out to a thickness of 200 nm at 0.2nm/sec in vapor deposition speed, it was considered as the negative pole, and the organic electroluminescence element was produced. Under dry atmosphere, when the direct-current voltage of 15V was impressed to the produced organic electroluminescence element, the current of 76 mA / cm^2 flowed into it. Green luminescence of luminosity 680 cd/m^2 was checked. The half-life of luminosity was 420 hours.

[0086]

[Effect of the Invention]Luminous efficiency was high, the luminescence life was long, and this invention enabled it to provide the organic electroluminescence element excellent in endurance.

[Brief Description of the Drawings]

[Drawing 1]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 2]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 3]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 4]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 5]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 6]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 7]It is an outline construction drawing of an example of an organic electroluminescence element.

[Drawing 8]It is an outline construction drawing of an example of an organic electroluminescence element.

[Explanations of letters or numerals]1: substrate 2 -- :anode 3:electron hole pouring transportation layer 3a:electron hole pouring transportation ingredient 4: -- luminous layer 4a:luminescence ingredient 5:electronic pouring transportation layer 5": -- electron -- pouring transportation layer 5a:electronic pouring transportation ingredient 6:negative pole 7: -- power supply

[Translation done.]